TA of AV junction by right atrial approach in 2, and left retroaortic in one, followed by pace-maker implantation; all died late from procedure-unrelated causes. EP "coordinates" (A, H, and V amplitude, A/V ratio, and HV interval) of TA target sites were correlated to the level and extension of the lesions as assessed by serial histologic sections of the specialized AV CS. The first pt showed two level- histologic interruption of CS: 1) bifurcating AV bundle and bundle branches, and 2) AV node and penetrating AV bundle, with spared common His bundle, which, respectively, corresponded to a "distal" TA target site (A = 0.3 mV, V = 1.5 mV, A/V = 0.2, H = 0.5 mV, and HV = 40 ms) resulting in 2:1 AV block, and to a "proximal" site (A = 0.8 mV, V = 0.5 mV, A/V = 1.6, H = 0.15 mV) leading to complete AV block (CAVB).

The successful TA target site in the second pt (A = 1 mV, V = 0.75 mV, A/V = 1.3, H = 0.35 mV, HV = 60 ms) provoked a suprahissian CAVB due to a selective disruption of atrionodal approaches, AV node and proximal His bundle. In the third pt, radiofrequency current delivered on the left side of the AV junction (A = 0.2 mV, V = 1.5 mV, A/V = 0.13, H = 1.2 mV, HV = 55 ms) induced a "distal" CAVB with involvement of bifurcating bundle and left bundle branch. Thus, TA of AV junction created "discrete" interruptive lesions of the AV CS at different levels that matched EP target sites.

SUNDAY POSTER

913-123 *In vivo* Experiment of Radiofrequency (RF) Energy Application Using Bio-battery-induced Temperature Monitoring

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We have shown that electrode tissue interface temperature can be measured during delivery of RF energy without thermistors or thermocouples using a bio-battery method. *The aims of this study* are to obtain reproducible bio-battery data in an in vivo experiment using a metal back plate, and to determine weather copper or aluminum is preferable for the back plate. *Method:* An 8 Fr. catheter (EPT 6303) with a thermistor mounted on the tip of a 4 mm long distal electrode and a 7 Fr. catheter (Webster) with a thermocouple mounted in a 4 mm long distal electrode were used in this study. RF energy was generated by a custom-made generator with the capability of measuring galvanic current during tissue heating. An aluminum or copper back plate was placed on the dorsum of the dog. The catheter was placed in the four chambers of the heart under fluoroscopic guidance in an open chest preparation. RF output, electrode-tissue interface temperature and galvanic current were collected simultaneously during RF energy delivery. *Results:* The electrode-tissue interface temperatures correlate well with galvanic currents, r = 0.98 ± 0.01, (n = 14) for the EPT catheter and 0.97 ± 0.02, (n = 3) for the Webster catheter. The aluminum back plate yielded a higher galvanic current consistent with the theoretical value of contact potentials. There was a rapid decline of galvanic current when the electrode-tissue interface temperatures exceed 68–78ºC.

Conclusions: Monitoring the electrode-tissue interface temperature during RF application is feasible by this bio-battery technique with conventional catheters and a metal return plate. The aluminum back plate generates higher galvanic cell current than the copper. This technique is promising to measure electrode-tissue interface temperatures during RF energy delivery without the cost, complexity and limitations of thermistors and thermocouples.

913-124 Right Atrial Multipolar Catheter Ablation of Atrial Fibrillation in a Pace-Induced Goat Model

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Left atrial ablation may be associated with thromboembolic stroke. To determine whether atrial fibrillation of acute onset could be terminated by radiofrequency catheter ablation in the right atrium only, we created endocardial linear lesions in an acute model of pace-induced atrial fibrillation in the Alpine goat (45 kgs). Atrial fibrillation of >5 minutes duration was inducible within ten applications (for 30 seconds each) of alternating current (A.C.) in the right atrial appendage in 8 goats. An 8F guiding catheter was introduced via the right femoral vein. Through the guiding catheter, a non-deflectable flexible octapolar ablation catheter ("Pathfinder" – Cardima) was advanced into the right atrium. The octapolar ablation catheter was aligned along 5 predetermined right atrial linear trajectories which linked the orifices of the superior and inferior vena cavae, the coronary sinus and the tricuspid annulus. Radiofrequency energy was applied through four electrodes simultaneously in a unipolar fashion. Atrial fibrillation was rendered non-inducible in 8 of 8 goats. Pathology and histology confirmed that linear transmural burns were achieved. While the lesions were continuous they were not, however, of uniform intensity throughout their length.

Conclusions: Continuous atrial lesions can be created by a flexible non-deflectable multipolar ablation catheter by the use of a guiding catheter. A right sided only approach to catheter ablation of atrial fibrillation is effective in acute onset atrial fibrillation in this experimental model and may be worthy of study in patients with paroxysmal atrial fibrillation and structurally normal hearts.

913-125 Transcatheter Ablation of Chronic Atrial Fibrillation in the Canine Rapid Atrial Pacing Model: Is the Cure Worse Than the Disease?

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The transcatheter creation of linear atrial lesions in the RA and LA to ablate atrial fibrillation (Afib) is becoming a current treatment modality. In this study we examined the rhythm outcomes as well as the incidence of other arrhythmias during ablation of chronic Afib via linear lesion placement. *Methods:* In 6 mongrel dogs, rapid pacing pacemakers (Pacesetter SX2-FAST) were implanted. The pacemakers were used to simultaneously pace the RA appendage at 400 B/M and the low RA at 130 B/M at 2× threshold and 0.5 msec pulse width. After development of chronic Afib, the pacemakers were turned off, and the dogs were observed for 24 hours. None of the dogs reverted back to sinus rhythm RA and LA linear lesions were generated using a specially designed catheter system (EPT). A total of 42 lesions were created in random order at 5 different locations: (1) posteriorly, between the superior vena cava (SVC) and the inferior vena cava (IVC); (2) between the SVC and the tricuspid ring; (3) horizontally circular above the mitral ring; (4 vertically bisecting the pulmonary veins; and (5) vertically, lateral to the LA appendage. After the creation of each lesion, rhythm outcome and arrhythmia inducibility were measured 10 consecutive times and categorized as sustained (Sust) or non-sustained (NSust) Afib, atrial flutter (Aflt), or sinus rhythm (SR). *Results:* After the generation of lesions, in only 1/6 dogs (17%) Sust Afib was still persistent. Sust Aflt was persistent in 2/6 dogs (33%). Only SR was recorded in 2/6 dogs (33%), and NSust Aflt followed by SR was recorded in 1/6 dogs (17%). In each case Sust Aflt could be terminated by overdrive pacing (cycle length = 50 msec). *Conclusions:* 1) Using this technique, chronic Afib was ablated in 5/6 dogs (83%). 2) In 33% of the dogs the outcome was Sust Aflt which could be terminated by overdrive pacing. 3) NSR was achieved in 33%. Although Afib was successfully ablated, it is likely that RF lesions will result in a high incidence of Aflt which may be more difficult to ablate than Afib and may result in rapid ventricular response.

913-126 Use of Multipolar Conformal Catheters to Produce Linear Transmural Lesions in the Atria with Radiofrequency Energy

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Atrial fibrillation has been ablated percutaneously with transvenous radiofrequency (RF) catheter ablation in a modified maze procedure. Unfortunately, attempts with a 4 mm tip catheter require many hours and prolonged fluoroscopy. Our purpose is to design several conformal multipolar catheters which require only single step positioning to generate linear transmural lesions and replicate the surgical maze procedure. The material of conformal catheters has malleable properties such that when heat (DC) is applied, the distal catheter conforms to a predetermined shape. This allows access to the atrial vasculature. When the activating heat is removed, the catheter opens and conforms to the shape of the atrial chamber.

Methods and Results: Four Yorkshire swine weighing 25–45 kg were used to test the catheters. Three different shaped 7 French 8–24 multipolar conformal catheters (Elecath, Rahway, NJ) with electrodes 2–5 mm in length and interelectrode spacing 2–3 mm were designed to conform to the area around the right atrial appendage, superior vena cava to inferior vena cava, lateral right atrium and pulmonary veins. Following fluoroscopic verification of position, bipolar RF energy was delivered sequentially to the electrodes for 30–90 seconds at 30–45 Watts, modified to keep impedance <150Ω. One week later, the pigs were euthanized, and the entire heart was removed, examined grossly and sectioned. Continuous transmural linear lesions were formed. The longest linear lesion was 7.2 cm by 0.6 ± 0.3 cm.

Conclusion: Multipolar conformal catheters with RF energy can create long transmural atrial lesions which may be helpful in the future to simplify the percutaneous maze procedure.